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Mr. Donald H. Gips
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2000 M Street, N.W.
Washington, DC 20554

Re: *Documents provided to peer review panel relating to DARS pioneer's preference (IB Docket No. 95-91; GEN Docket No. 90-357; PP-24; PP-86; PP-87)*

Dear Messrs. Smith and Gips:

On August 30, 1996, the Commission forwarded the three requests for pioneer's preferences for satellite digital audio radio services ("DARS") and a series of related documents to the recently constituted peer review panel for DARS pioneer's preference requests. These documents were to form the basis of the panel's decision whether or not a preference should be granted to each applicant. The Commission cautioned the panel to avoid oral *ex parte* contacts and confine its review to the materials submitted by the applicants "*and that are part of the public record*" (emphasis supplied). We are placing this letter in the public record to ensure compliance with the Commission's directive and ask the Commission to forward it to the panel members.

Although the Commission has provided the panel with a substantial number of documents for its review and invites the panel to request additional material, it has not provided the panel with a list or description of the documents it is *not* forwarding. We write this letter to urge the Commission to provide the panel with certain documents not on the list of forwarded documents "that are part of the public record" and are critical to any pioneer's preference

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decision in this DARS proceeding. Specifically, the Commission should provide the panel with two *ex parte* letters, dated March 22, 1996 and March 29, 1996, submitted to the Commission by Satellite CD Radio, Inc. ("CDR"). As the attached statement of Melvin Barmat¹ demonstrates, the omission of these *ex parte* letters deprives the panel of critical information not contained in CDR's prior submissions. Indeed, so that the panel has a complete record, we ask the Commission also to forward this letter and accompanying declaration, as well as relevant portions of CDR's comments and reply comments that are described below.² For the Commission's convenience, we attach to this filing a copy of the documents that we ask the Commission to forward to the panel.

As Mr. Barmat explains, as a result of significant amendments to CDR's initial pioneer's preference request, as evidenced by the *ex parte* letters and other CDR filings, CDR's proposed system is now dramatically different from its initial request in three important respects. First, it has switched from time division multiplexing ("TDM") to code division multiplexing ("CDM") technology. Second, it appears to have abandoned its use of frequency diversity. And third, it now proposes to use gap filler terrestrial repeaters -- a technique that at one point in the proceeding CDR distanced itself from in an effort to distinguish itself from other pioneer's preference applicants such as Digital Satellite Broadcasting Corporation ("DSBC"), which has advocated gap filler terrestrial repeaters from the beginning.

Perhaps most significant among these changes is the consequential effect of CDR's switch from TDM to CDM. Not only does this change remove one of CDR's claimed areas of innovation (frequency diversity), CDR's system, in this respect, is now remarkably similar to the DARS system proposed by DSBC. Indeed, DSBC's proposed DARS system has incorporated CDM-facilitated technology since its application was filed in 1992. CDR now embraces CDM for the same beneficial reasons that DSBC recognized long ago -- promotion of more efficient use of DARS spectrum, better transmission characteristics (*e.g.*, resistance to fading and noise, and multipath tolerance) and facilitation of the use of terrestrial repeaters. CDR should not be rewarded for its belated assimilation of a technology previously (and consistently) proposed by one of its competitors.³

¹ Mr. Barmat is a principal of Jansky/Barmat Telecommunications, Inc.

² While we ask the Commission to forward the relevant portions, we would not object if the Commission decided instead to forward the entire documents along with this letter.

³ Because DSBC's and CDR's DARS systems now employ similar technology, it would be reversible error to award a pioneer's preference to CDR and not to DSBC. If the peer review panel (and

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CDR's other claimed areas of innovation are likewise invalid. Specifically, as Mr. Barmat explains, CDR's claims of innovation in the areas of planar array antennas, digital coding and compression of audio signals, and advanced mobile receivers are erroneous or unsupported. In addition, CDR's claimed demonstration of technical feasibility demonstrates nothing about the feasibility of CDR's actual system, because the receivers in its test received 50 times greater power than they would from CDR's proposed satellite system.

In order to ensure that the peer review panel can make a fully informed decision, it is vitally important that the peer review panel receive copies of these recent filings. We therefore urge the Commission to forward to the panel members (1) the two March 1996 *ex parte* letters submitted by CDR, (2) the relevant portions of CDR's comments and reply comments (attached hereto), and (3) this letter and accompanying statement by Mr. Barmat.

Very truly yours,


Diane S. Killory

Counsel for Digital Satellite
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Cheryl A. Tritt

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Commissioner Rachelle Chong
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William Kennard, Esq.
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All Parties (see attached Certificate of Service)

ultimately the Commission) deem CDR's system worthy of a preference, it must likewise find DSBC's system deserving of a preference.

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**A STATEMENT REGARDING
INPUT INFORMATION FOR THE DARS
PIONEER'S PREFERENCE REVIEW**

I. INTRODUCTION

On August 30, 1996 Messrs Gips and Smith of the FCC sent a letter to members of a peer review panel who will evaluate several pioneer's preference requests in the satellite digital audio radio service (DARS) proceeding. Attached to the letter was a list of documents provided to each of the panel members to assist in their evaluations. However, there are some recent documents of significant importance that, according to the document list, were not provided to the review group.

Specifically, in March 1996, CD Radio (CDR) sent two ex parte letters to the Commission, one of which summarized an ex parte meeting with Commission staff. As outlined below, these letters describe a change in the signal multiplex technique that CDR intends to employ, i.e., from time division multiplex (TDM) to code division multiplex (CDM).¹ Although this change is characterized by CDR as minor, in my view the implications flowing from the

¹ No details of the new signal parameters, nor link budgets, nor resulting margins, nor interference consequences of the change were included in these letters, making the audio performance impact impossible to assess.

information in these ex parte letters are of critical importance in having a complete record before the review panel to evaluate the pioneer preference requests.

II. DISCUSSION

In most instances, a change in the type of multiplex or modulation techniques in a satellite system, as long as the overall use of bandwidth and interference levels remain constant, is not of concern to those other than the system operator and users. However in this case, where claims of pioneering technology are being evaluated, the underlying causes for, and the consequential effects of, such changes need to be scrutinized.

Since 1993, CDR has proclaimed that its combined use of both spatial and frequency diversity among the satellites in its system constituted a major element in its claim for a pioneer's preference. However, after several years of heralding the vital necessity of both spatial and frequency diversity, mention of frequency diversity is glaringly absent from CDR's two March 1996 ex parte letters. Instead, CDR notes the advantage of spatial diversity and the propagation, and other advantages of orthogonal code division multiplexing (CDM). While not specifically stating so, the very clear implication of the March 1996 ex parte letters is that frequency diversity is no longer an element of the CDR system. It would appear that only spatial diversity remains of this aspect of CDR's claim to "pioneering". However, it is appropriate to note that use of spatial diversity is conventional practice in terrestrial microwave systems and is also an essential

element in the Navstar-GPS satellite navigation system², as described in the literature since the late 1970's. It is difficult to understand how the use of spatial diversity can be claimed as "pioneering" or "innovative".

CDR's change to CDM would appear to also be related to another of CDR's "moving target" claims for a Pioneer's Preference. In its initial (July 1991) Request for a Pioneer's Preference, CD Radio (CDR) indicated that it was entitled to such an award because it was the first to petition the FCC (May, 1990) to provide "complementary satellite and terrestrial audio radio service" (i.e., gap filling repeaters) (emphasis added). However, in a June 1993 Supplement to its Pioneer's Preference Request, CDR not only repudiates the need for terrestrial gap filler repeaters to augment urban DARS service, it distinguishes itself from the other applicants that requested them. (1993 Supplement at P.3).

A further CDR change of heart appeared in its 1995 Comments (pages 94-96) and Reply Comments (pages 55-56) to the Commission's NPRM, where CDR suggests that the Rules "should facilitate the use of terrestrial gap fillers to optimize satellite DARS coverage"

² Although receipt of signals from only three GPS satellites is theoretically needed for an "instantaneous" navigation "fix" [four are usually desired to remove the ambiguity], the GPS constellation is designed for, and the precision use of the system requires that at least five satellites are in view for such a "fix". Most current commercial grade GPS receivers have the capability to track eight (8) spacecraft and some have the capacity for twelve (12). It may be of interest to note that the Russian Glonass satellite navigation system has employed spatial and frequency diversity since the mid-1980's.

because "some terrestrial gap fillers will still be necessary". The clear advantage to the use of CDM to facilitate the operational aspects of terrestrial gap fillers is explained in an ESA technical paper³. The paper notes the importance of interference-free, spectrum conservation factors of a DARS system employing orthogonal CDM for both satellite and terrestrial transmitters. Thus it would appear that CDR intends to employ CDM for the same reasons it was employed by DSBC, i.e., superior resistance to propagation impairments and interference, and the fact that CDM facilitates the operational aspects of terrestrial gap fillers.

III. OTHER MATTERS

CDR's switch to the use of CDM technology employed by its competitor (DSBC) is illustrative of other instances where CDR has claimed a pioneer's preference for technology introduced by others. Indeed, while CDR highlights the fact that it was the first company in the U.S. to petition the FCC to provide DARS service, it fails to note that the technology and spectrum usage pioneering for DARS systems had occurred earlier in Europe. At the 1988 WARC the European Broadcasting Union (EBU) reported on and demonstrated well-advanced technology⁴, and made strenuous efforts to have the

³ "Digital Audio Broadcasting by Satellite Utilizing Trellis-Coded Quasi-Orthogonal Code Division Multiplexing", R. DeGaudenzi, ESA Journal 1992, Vol. 16.

⁴ See "Advanced Digital Techniques for UHF Satellite Sound Broadcasting" published by the EBU, September 1988.

Conference address the spectrum requirements of DARS⁵. CDR also fails to recognize the fact that the first satellite-based DARS demonstration in the U.S. was a joint effort of NASA and the USIA's Voice of America, which took place in December 1991⁶. We remind the Commission of several other examples where CDR's pioneering claims will not survive a "reality check":

<u>Claim</u>	<u>Reality</u>
Terrestrial vehicular tests at S-band "confirmed the technical feasibility of the CD Radio system design". Appendix A to the 1993 Supplement.	The received signal at the vehicle was more than 17 dB (50 times) higher than would be received from a CDR satellite ⁷ , and thus it is difficult to assign any significance to these CDR test results.

⁵ The '88 WARC did not address the DARS spectrum issues but adopted Resolution 520 calling on the next competent Conference to do so.

⁶ "NASA and USIA Demonstrate Satellite Radio Broadcasting", Telecommunications Highlights, International. 12/11/91.

⁷ The table below lists the relevant transmission factors excerpted from the link budgets for CDR's proposed satellite service* and the test described in the Supplement**.

	<u>Satellite*</u>	<u>4/93 Test**</u>
Transmit EIRP (dBW)	57.0	-3.0
Path Loss (db)	<u>192.0</u>	<u>112.0</u>
Signal at Receiver (dBW)	-135.0	-115.0
Vehicle Ant Gain (dB)	3.0	1.0
Losses (dB)	<u>----</u>	<u>0.5</u>
Received Carrier Signal (dBW)	-132.0	-114.5

*CDR Compendium, Sept. 14, 1992, Table 1

**1993 Supplement, Appendix A, Appendix A3, Page 14
Table A3-2

CD Radio developed an extremely small planar array antenna. (1993 Supplement, P.15)

CD Radio worked with the U.S. government to obtain an international allocation for satellite DARS at the '92 WARC. (1993 Supplement, P.10)

CD Radio claimed to be the developer of an advanced mobile receiver.

CD Radio worked with AT&T-Bell Laboratories to incorporate a highly sophisticated technique for compressing audio signals. (1993 Supplement P.15)

Papers were published and patents issued in the 1970's for "microstrip" planar arrays.⁸

The U.S. allocation at S-band is a country-specific, footnote allocation, which is almost a "gimme" at the ITU - and which was actually accomplished by dedicated U.S. government employees at the Conference.

No details of the CDR contributions were provided - only the display of the work of others.

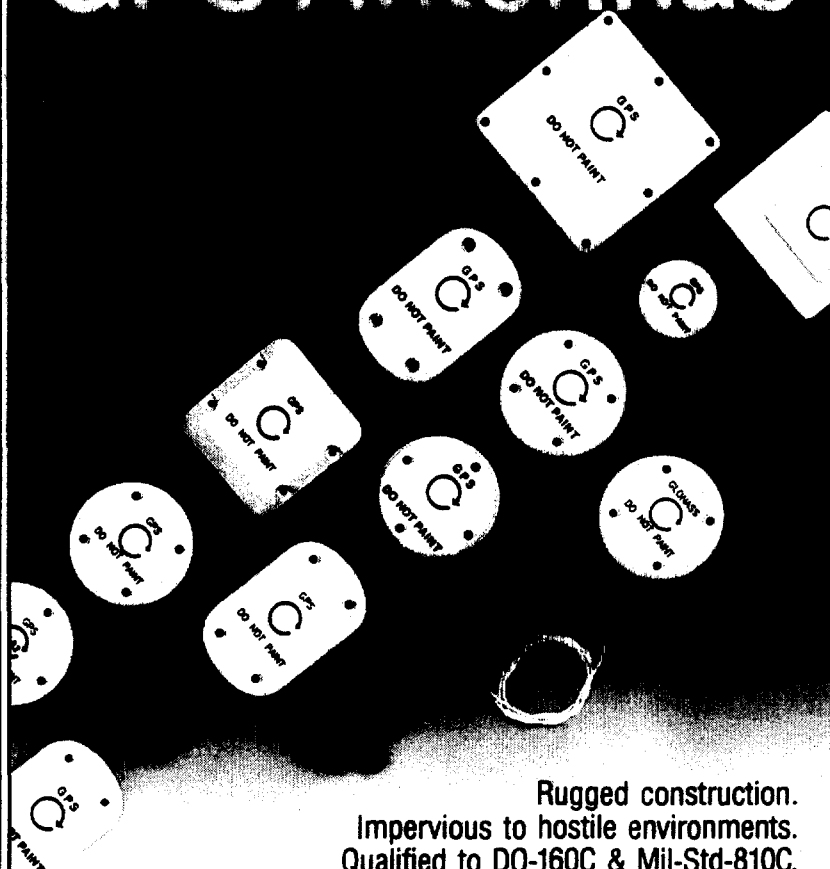
The AT&T paper attached to the CDR Supplement describes the audio system used but the paper makes no mention of CDR contributions.


Melvin Barmat

9/12/96
Date

⁸ R.E. Munson, "Conformal Microstrip Antennas and Microstrip Phased Arrays" IEEE Trans. Antenna Prop., Jan. 1974, pp. 74-78. Also see attached advertisement from "GSP World Showcase", Vol. 7, Number 8.

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I, Kathryn M. Stasko, do hereby certify that the foregoing **LETTER FROM DIANE S. KILLORY AND CHERYL A. TRITT TO RICHARD M. SMITH AND DONALD H. GIPS (and attachments)** has been furnished, via first class mail on this 13th day of September, 1996, to the following:

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